Mission Assignment: Describe the properties of polymers

KS3-17-04

Examine samples of different polymers and complete the table below with your observations. Include a description about what makes each plastic unique.

Polymer	Describe the polymers appearance	What is this polymer used for?	Observable physical properties	Unique properties
Polystyrene				
Polyvinyl Chloride (PVC)				
Nylon				
Polythene				
Clear Acrylic				

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1. What is meant by the term ‘polymer’?

2. List three properties all polymers have in common.

3. Polymers are made by combing monomers into a long chain. They are named by taking the name of the monomer and adding the prefix poly; e.g. polymerising butene forms polybutene.
Name the polymers formed from the following monomers.

Monomer	Polymer
Styrene	
Ethene	
Propene	
Vinyl chloride	
Tetrafluoroethene	

4. Describe how the properties of the polymer in the kettle are different from the properties of the polymer in the bottle.

Challenge: In the 20th century plastics transformed how the world lived.
Suggest why plastics were a popular material used to make products.

In the 21st century the use of plastics to manufacture products is not as popular.
Explain why?

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ANSWERS

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Examine samples of different polymers and complete the table below with your observations. Include a description about what makes each plastic unique.

Polymer	Describe the polymers appearance	What is this polymer used for?	Observable physical properties	Unique properties
Polystyrene	brittle, rigid	Packaging, insulation, disposable utensils, toys	Lightweight, heat resistant, some can be flexible	Heat resistant
Polyvinyl Chloride (PVC)	Rigid or flexible, white or clear	Pipes, flooring, electrical cable insulation, medical tubing	Durable, resistant to abrasion and chemicals, good electrical insulator	Good electrical insulator / durable
Nylon	Tough, flexible, translucent	Clothing, carpets, toothbrush bristles, fishing line	High strength, good abrasion resistance	High strength
Polythene	translucent or opaque	Packaging, bags, films, pipes	Lightweight, good chemical resistance, flexible	Flexible
Clear Acrylic	Clear, transparent	Signs, displays, lighting fixtures, lenses	High transparency, good impact resistance	High transparency, scratch-resistant transparency,

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ANSWERS

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1. What is meant by the term 'polymer'?
   A large chain molecule made up joining small molecules called monomers

2. List three properties all polymers have in common.
   Chemically unreactive, solid at room temp and easily molded into shape

3. Polymers are made by combing monomers into a long chain. They are named by taking the name of the monomer and adding the prefix poly; e.g. polymerising butene forms polybutene.
   Name the polymers formed from the following monomers.

Monomer	Polymer
Styrene	Polystyrene
Ethene	polyethene
Propene	Polypropene
Vinyl chloride	Polyvinyl chloride (PVC)
Tetrafluoroethene	polytetrafluorothene

4. Describe how the properties of the polymer in the kettle are different from the properties of the polymer in the bottle.

Polymer in kettle has higher melting temperature and is rigid and opaque, whereas the polymer in the bottle is flexible and transparent.

Challenge: In the 20th century plastics transformed how the world lived.
Suggest why plastics were a popular material used to make products.
Plastics were popular in the 20th century because they are lightweight, durable, versatile, and can be easily molded into different shapes. They are also cheaper to produce compared to traditional materials like glass, metal, and wood.

In the 21st century the use of plastics to manufacture products is not as popular.
Explain why?
In the 21st century, there is growing concern about the environmental impact of plastics, particularly their contribution to plastic pollution and microplastic contamination. This has led to increased regulation and public pressure to reduce plastic use and increase recycling and waste management efforts.